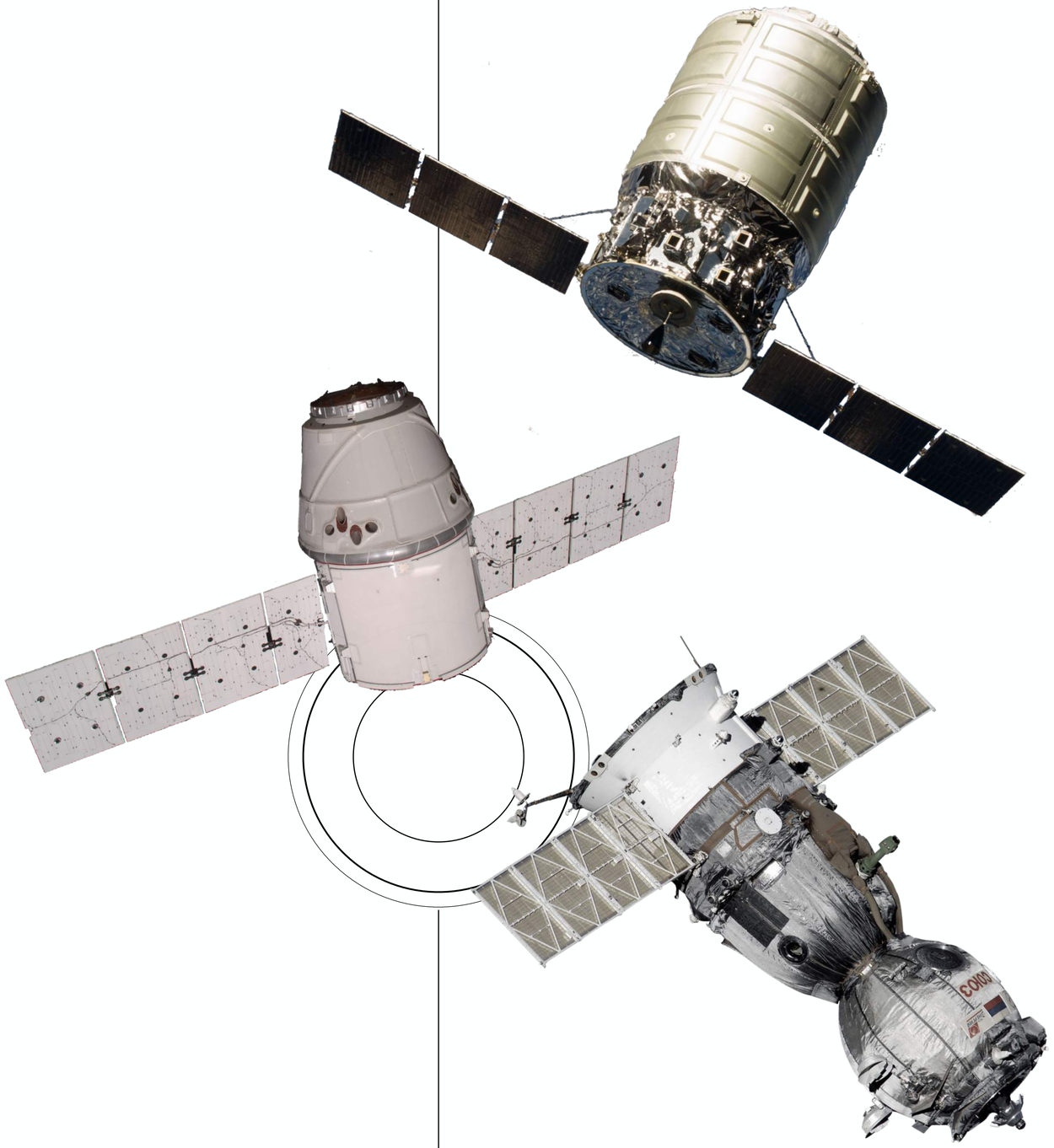
NANORACKS

THE OPERATING SYSTEM OF SPACE

Founded in 2009, NanoRacks prides itself on being the market leader in low-Earth orbit. Operating the only commercial research lab on the International Space Station, NanoRacks has paved the way for open access to space.

Presentation to UN Workshop - Costa Rica, Marc 2016
Jeffrey Manber, CEO, NanoRacks



HOW WE WORK

WHO WE ARE

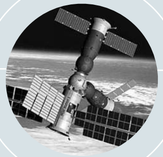
- Started self-financed in storage facility space in 2009 by Jeffrey Manber and Mike Johnson
- In five years we have disrupted the market for low-earth orbit services; developed first US commercial Cubesat deployment program, first commercial successful biomedical program and proved LEO market
- Pioneered US/international commercial participation on the Space Station
- Developed Unique Operational Expertise in Commercial Relations with NASA and other ISS space agencies

HOW WE OPERATE

- NanoRacks operates principally under a Space Act Agreement (SAA #6355)
- This allows us to:
  - Directly access ISS manifest
  - Access NASA Crew Time
  - Manage Payload Integration
  - Independently own hardware
  - Negotiate new agreements

NANORACKS

HISTORY AND PERFORMANCE



1999
MirCorp

2009
Space Act Agreement

2010
Flew First Customer Experiment

2011
Raised $500K Seed Round

2012
Deployed First Satellite

2013
Delivered 100th Payload

2013
Raised $4.5M Series A Round

2015
First non-ISS payload launched on Blue Origin's *New Shepard* test flight

DEPLOYED 96 CUBESATS FROM ISS
with scheduled cubesats totaling 100 by end of 2015

OVER 250 CUSTOMER PAYLOADS
delivered on 20 missions

BUILT EXTERNAL PLATFORM
ready to launch

INSTALLED NEW EQUIPMENT
such as our research centrifuge, Kaber deployer, external platform, and our biomedical plate reader

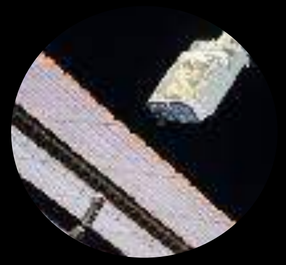
EXPANDED TO 40 EMPLOYEES
in 3 offices in DC, Houston, and Silicon Valley

CREATION OF NEW BUSINESS LINES
in satellite deployment and in-space services

RAISED $5 MILLION
in Seed and Series A funding

*Includes $34M undrawn from NASA IDIQ contracts

NANORACKS



Cubesat Deployment
(From JAXA Airlock)

Research Platform

Commercial Researchers, Biopharma

MicroPlate Reader & Biopharm

MixStix

Privately owned microgravity research equipment

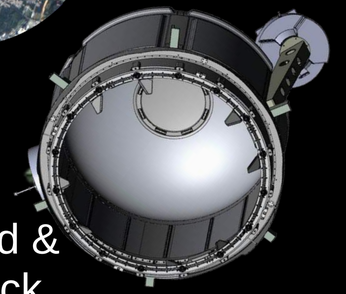
NanoLab

Kaber NanoSat Deployer

Domestic and Foreign Industry

External Platform

Earth Observation



Privately Owned & Operated Airlock

Commercial and Government Organizations Worldwide

Space Station Operating System: Free Flyers, Commercial Modules, Commercial Space Station

Own Platforms

Evolution of ISS Hardware & Customer Base

2009 2010 2011 2012 2013 2014 2015 2016 2017 2022

OUR CUSTOMERS

Our customers include everyone from high schools to government space agencies, all who pay for our services on a commercial basis. The client base includes NASA, the German Space Agency, ESA, Planet Labs, Spire, biopharmaceutical firms, Urthecast and dozens of high schools and universities. Our customer base is thoroughly international, with companies and organizations from Romania to Israel, from Peru to Saudi Arabia, as well as a full range of government and private customers from the United States.

NANORACKS CUSTOMERS AROUND THE WORLD

SERVICE LINES

SPACE DEPLOYMENT SERVICES

OUR CURRENT SERVICES INCLUDE satellite deployment, biopharm services, test platforms for advanced earth observation sensors, materials and educational research platforms—wherever there is a need for space goods or services, NanoRacks is part of the commercial solution.

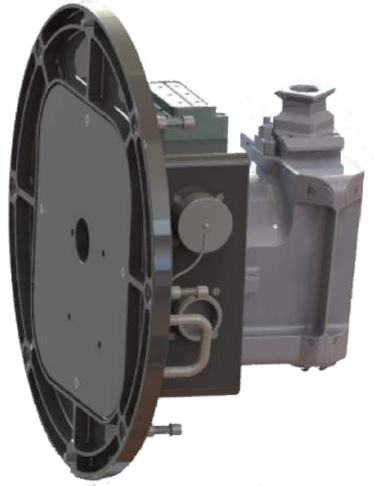
NANORACKS CUBESAT DEPLOYER (NRCSD)

- Low-cost deployment system using Japanese module on ISS
- Deployed more satellites in the last 2 years than any other launch service provider
- Each NRCSD can deploy up to 6U of CubeSats
- 8 NRCSD's per airlock cycle, for a total of 48U deployment capability
- ~ Approx. 2 Air Lock cycles per mission

- 51.6 degree inclination, 385-400 KM
- Orbit lifetime 6-12 months
- Deployment typically 1-3 months after berthing
- Soft stowage internal ride several times per year

KABER SMALL SATELLITE DEPLOYER

- New Kaber deployer to deploy medium 50 kg to 75 kg satellites
- Size favored by NASA, Air Force, and other high-value customers
- NanoRacks Separation System
- Launched via pressurized cargo resupply vehicle to the International Space Station



SERVICE LINES

SMART SPACE PLATFORMS

NANOLABS

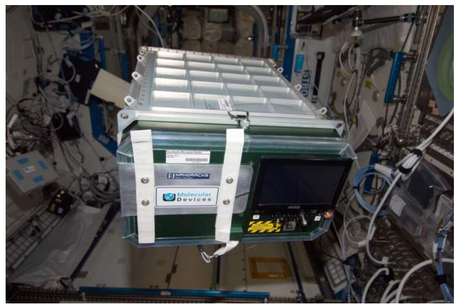
- Affordable and accessible experiment platform based on the Cubesat form-factor
- **Available on ISS, Blue Origin's *New Shepard*, and other platforms**

MIXSTIX

- Fluid mixture enclosure tubes for biological, plant sciences, and more
- **Very popular among education customers**
- **Most famously known for Ardbeg terpene experiment**

STATION LAB EQUIPMENT

- Suite of lab equipment aboard ISS for biological, chemical, material and physical experiments
- Two microscopes, a centrifuge, and plate reader



SERVICE LINES

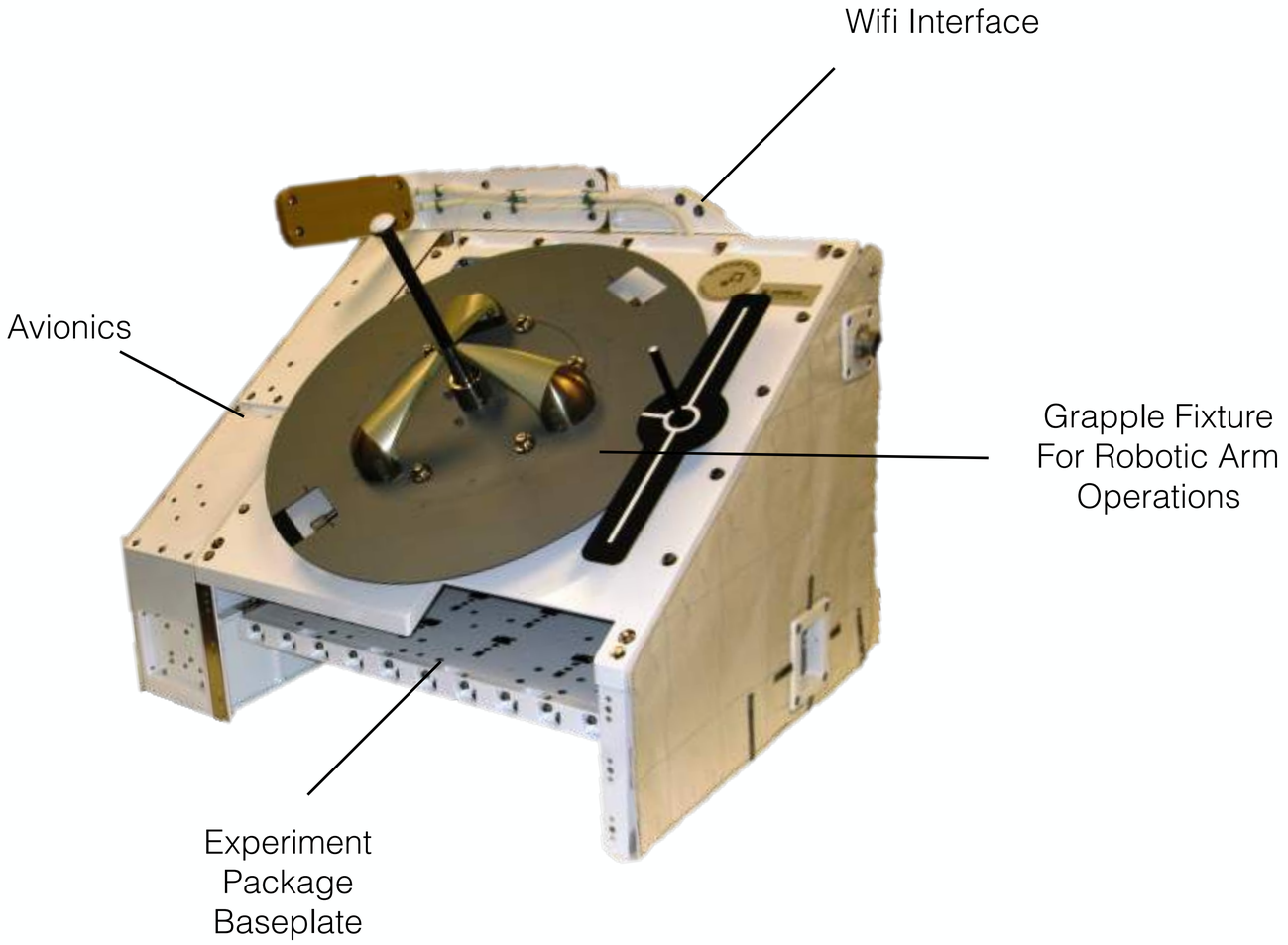
NANORACKS EXTERNAL PAYLOAD PLATFORM (NREP)

LAUNCHED TO ISS ON HTV-5- AUGUST 2015

EXTERNAL PLATFORM

- Platform placed on the exterior of the ISS to provide convenient access to space environment
- Serves technology developers, aerospace companies, and government tech-labs for in-space technology validation needs

Standard payload provisions	
Voltage	28 Vdc +/- 2 V or 120 Vdc as option
Total power	30 W at 28 Vdc
Maximum current	2A
USB 2.0 bus	5 Vdc/ 500mA non-switchable
Total payload data rate	Up to 8 Mbit/s



SERVICE LINES

NANORACKS EXTERNAL CYGNUS CUBESAT DEPLOYMENT

EXTERNAL CYGNUS DEPLOYMENT

- Payloads on the exterior of the Cygnus vehicle
- Cygnus to boost to higher orbits after ISS resupply complete
- Altitude near ~450 km
- Inclination of 51.6 degrees
- NanoRacks CubeSat Deployer
    - On External Panel 5
    - 6U in length
    - 2x3U configuration (36U total)

BE A PART OF OUR STORY.

BLUE ORIGIN & NANORACKS

For the first time ever, you may join Blue Origin and NanoRacks on a journey to suborbital space on *New Shepard,* Blue Origin's commercial suborbital launch vehicle.

The very same NanoRacks you know from the International Space Station, is pleased to now offer our customer services to suborbital space for *New Shepard.*

01 FULLY REUSABLE VEHICLE

02 LARGEST WINDOWS IN SPACE

03 CUSTOMIZABLE PLATFORMS

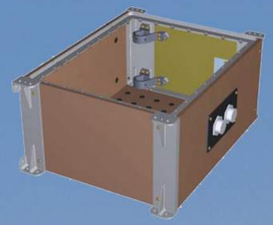
04 DESIGNED FOR RESEARCHERS

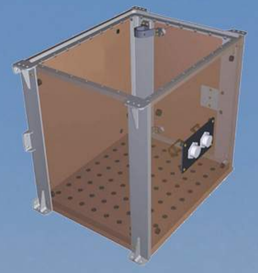
NANORACKS
IN-HOUSE CUSTOMER SERVICE

- PAYLOAD INTEGRATION
- PAYLOAD DESIGN & DEVELOPMENT
- SAFETY APPROVAL
- INTERFACE WITH SENIOR BLUE ORIGIN TECHNICAL TEAM

READY TO GET STARTED? CONTACT US AT: SUBORBITALSERVICES@NANORACKS.COM

STANDARDIZED PAYLOAD LOCKERS





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Payload Mass	25 pounds / 11.34 kg	50 pounds / 22.68 kg
Payload Volume	1.73 ft^3 / 49 liters	3.61 ft^3 / 102 liters
Approx. Interior Dimensions	20.3 x 16.5 x 9.0 inches / 51.6 x 41.8 x 22.9 cm (less hinge area)	20.3 x 16.5 x 18.7 inches / 51.6 x 41.8 x 47.4 cm (less hinge area)
Power	28 VDC, 200 W peak	
Data	32 GB on-board data storage with synchronized flight parameter measurements; plus an additional 128 GB video storage provided for post-flight download	
Experiment Config. Software	Blue Origin software available to configure experiment command sequence, such as turning on sensors and other apparatus when microgravity is reached	

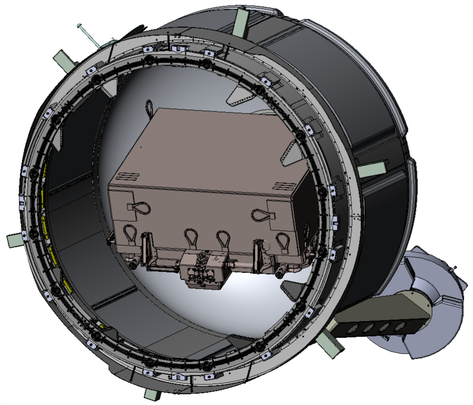
BLUE ORIGIN

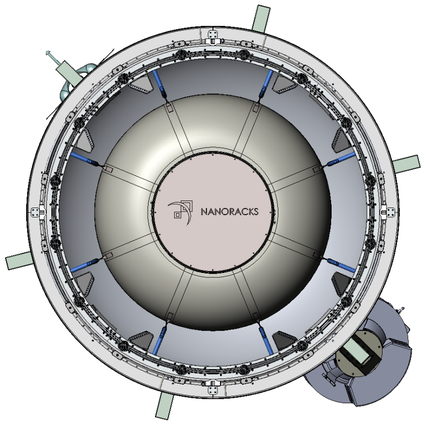
NANORACKS AIRLOCK

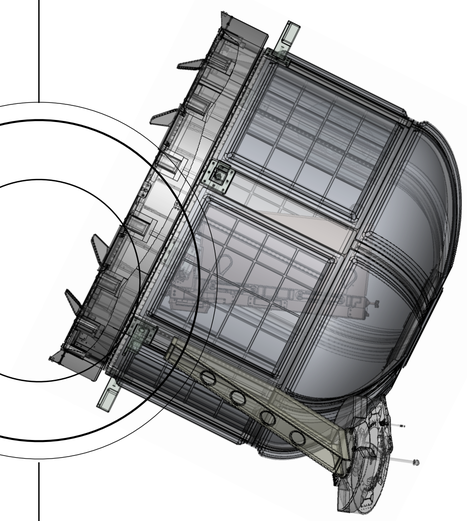
IMPLEMENTATION

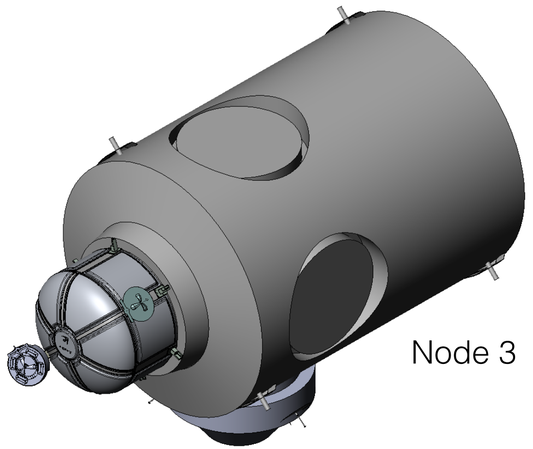
NANORACKS' COMMERCIAL AIRLOCK, will supercharge the satellite deployment business and open up new, lucrative business lines. Built as a pressurized teapot dome attached to the side of the ISS, The Airlock will be able to deploy large numbers of satellite, small and large, at a pace and schedule un-hindered by the many restrictions on NanoRacks' current deployer systems

Currently under approval process, expected ready in 2019.









Node 3

THE IMPORTANCE OF THE AIRLOCK IS:

- Maximum operational flexibility, more control over deployments
- Greater capacity - multi-satellite deployments and Large satellite deployments
- Stepping stone to use of platforms outside of ISS
- Additional capacity for External Platform customers
- Station equipment repair
- Required resources: $15m, for build, installation and checkout

OUR TEAM OF EXPERTS

JEFFREY MANBER

CEO, Founder

As CEO of MirCorp, which leased the Russian Space Station Mir, Jeff became the only western businessman to have marketed an orbiting space station. His experience across the industry – with Energia, PanAmSat, Shearson Lehman, US Department of Commerce and multiple startups make him an unparalleled expert and strategist in the business of space.

MICHAEL JOHNSON

Chief Designer, Founder

Mike Johnson is a space designer par excellence. With a long experience serving commercial space markets first with SPACEHAB and later NanoRacks, Mike has masterminded platforms that have powered our growth.

RICHARD GRUVER
CFO

CHRIS CUMMINS
Chief of Contracts, Products, and Pricing

RICH POURNELLE
Senior Vice President Business Development

MIKE LEWIS
CTO

KIRK WOELLERT
External Payloads Manager

MARCIA BLOUNT
Director of Houston Ops

MARK ROWLEY
Senior Engineer

MARY MURPHY
Internal Payloads Manager

CARL CARRUTHERS
Life Sciences Payload Manager

PATRICIA MAYES
DreamUp Director

RON GOEDENDORP
VP Space Station Opportunities

ABBY DICKES
Marketing and Comms. Manager

PETER BAK
Head of European Office

PREVIOUS EXPERIENCE INCLUDES:
MirCorp, Energia, PanAmSat, SPACEHAB, Lockheed Martin, XCOR, Tethers Unlimited, Odyssey Space Research, Outernet, US Office of Space Commerce, NASA, KPMG, Citi, Shearson Lehman, Near Earth

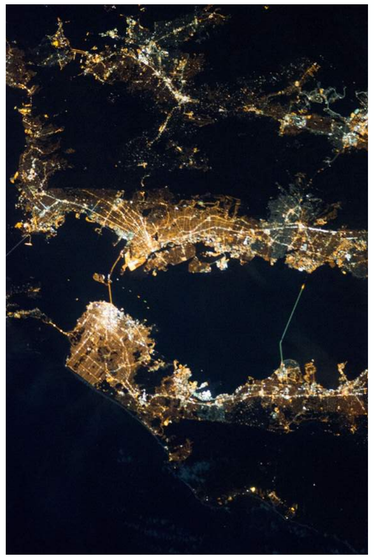
STRATEGIC LOCATIONS

HOUSTON, TEXAS

NanoRacks center of operations, strategically located next to NASA's Johnson Space Center. 20,000 sq. ft of labs, clean room, offices and meeting rooms.

WASHINGTON, D.C.

NanoRacks center for business development, with excellent access to customers, partners and government officials.



SILICON VALLEY, CALIFORNIA

NanoRacks base in Silicon Valley, serving important customers like Planet Labs, Spire, Made in Space and other potential satellite and space companies.

EUROPE OFFICE

Planned is a European office to allow us to fully integrate with European and Asian customers on a timely basis.

THANKS!

JMANBER@NANORACKS.COM